PAPER ID-311291

Subject Code: BOE308

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM III) THEORY EXAMINATION 2023-24
ANALOG ELECTRONICS CIRCUITS

TIME: 3HRS **M.MARKS: 70**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

Q no.	Question	Marks	CO
a.	Explain the concept of bias stability in amplifier circuits.	2	1
b.	Define transconductance amplifier	2	1
c.	What is a cascode amplifier?	2	2
d.	Name two types of RC oscillators and two types of LC oscillators.	2	3
e.	What is the Barkhausen criterion?	2	3
f.	Explain the terms CMRR and ICMR in the context of a differential amplifier.	2	4
g.	Differentiate between inverting and non-inverting amplifiers.	2	5

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a.	Describe various biasing schemes for BJT. Discuss the advantages and disadvantages of each biasing scheme	7	1
b.	Explain the concept of feedback in amplifiers and analyze various feedback topologies	7	2
c.	Explain the working of a tank circuit. Also derive the frequency of oscillation and condition of gain to get sustained oscillations for Colpitts oscillator.	7	3
d.	Analyze the V-I characteristics, output resistance, minimum sustainable voltage, and maximum usable load of a current mirror.	7	4
e.	Describe the operation of Schmitt triggers, and discuss their applications	7	5

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

a.	What is small signal analysis, and why is it important in amplifier design?	7	1
b.	Define different biasing schemes and techniques for FET amplifier	7	1

4. Attempt any *one* part of the following: **7 x 1 = 7**

a.	Discuss high-frequency transistor models and analyze the frequency response of single-stage amplifier	7	2
b.	Evaluate the effects of feedback on gain, bandwidth, stability, gain margin, and phase margin in amplifiers.	7	2

5. Attempt any *one* part of the following: **7 x 1 = 7**

a.	Explain the operation of non-sinusoidal oscillators and their applications in generating waveforms such as square waves and triangle waves.	7	3
b.	Review the basic concept of oscillators and explain the Barkhausen criterion for oscillation.	7	3

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6.	**Attempt any *one* part of the following:**	**7 x 1 = 7**	
a.	Describe the basic topology of a current mirror and its variants.	7	4
b.	Explain the structure and principle of operation of a differential amplifier.	7	4

7.	**Attempt any *one* part of the following:**	**7 x 1 = 7**	
a.	Describe the operation of precision rectifiers, and discuss their applications in signal processing and waveform generation.	7	5
b.	Define the following with reference to filter : (i) Pass Band (ii) Stop Band (iii) Roll-off rate (iv) Cut-off frequency	7	5